

“Connecting Karst Critters” Lesson Plan

By Mary Ann Mutrux, Willow Springs Middle School

Lesson Summary:

In this lesson students will study one of the five vulnerable cave organisms shown in the “Karst in the Ozarks” video. They will relate information about the critters to “nature concepts” (provided) and write a poem for the organism.

This curriculum was written to accompany the educational video “*Karst in the Ozarks.*” Students should watch the video before beginning the lesson. It is available online at <http://www.watersheds.org> .

Process Standard: 3.1

Students will demonstrate within and integrate across all content areas the ability to identify problems and define their scope and elements.

Science Contents Standards – Strand 5 Earth Systems:

SC4.3C4b (identify specialized structures for animals and describes how animals survive)

SC4.1D4a (human activities’ effect on organisms)

SC4.1D6ac (harmful activities – water pollution)

SC5.3A4ab (human erosion processes and solving environment problems)

Related Vocabulary:

Endangered species
Threatened species
Tumbling Creek cave snail
Ozark cave fish
Grotto salamander
Pink planarian
Bristly cave crayfish

Related Web Links / Background Information

<http://library.thinkquest.org/11883/data/biopoem.htm> [Biopoem instructions]

<http://mdc.mo.gov/nathis/endangered/endanger/endspeci/> [Importance of endangered species in Missouri]

<http://mdc.mo.gov/discover-nature/field-guide/ozark-cavefish> [Field guide/fact sheet on Ozark cave fish]

http://www.fws.gov/Midwest/endangered/fishes/ozkcf_fc.html [Fact Sheet on Ozark cave fish]

http://www.fws.gov/midwest/endangered/snails/tcca_fct.html [US Fish & Wildlife- Tumbling Creek cave snail]

<http://www.columbiamissourian.com/stories/2005/08/07/in-search-of-the-pink-planarian/> [News article on the pink planarian]

<http://www.fws.gov/midwest/FederalAid/documents/MissouriPlanSummary.pdf> [List of Missouri endangered species]

http://www.amphibiaweb.org/cgi-bin/amphib_query?query_src=aw_lists_genera_&table=amphib&where-genus=Eurycea&where-species=spelaea [Grotto salamander fact sheet]

http://www.fs.fed.us/r9/wildlife/tes/ca-overview/docs/cambarus_setosus-BristlyCaveCrayfishMTNF.pdf

[Bristly cave crayfish information]

http://www.utexas.edu/tmm/sponsored_sites/biospeleology/pdf/2007%20mo%20cave%20life.pdf [40-page "Missouri Cave Life" pdf booklet. Contains 4 of the 5 species, photos and glossary]

Required Materials:

- *Nature's Concepts* Handout
- Student computer and Internet access or printouts of information about at least two of the five vulnerable karst critters. **Note:** The fact sheets on the Tumbling Creek cave snail and the Ozark cave fish from the US Fish & Wildlife are the easiest to utilize.

Optional Materials:

- Provide copies of the *Karst Critter and Nature Concepts Connection Chart* handout.
- Projected Internet images of the five vulnerable cave species
- Projected copy or overhead transparency of *Natures Concepts*

Safety Considerations: none

Time Requirements:

Preparation Time: Teachers should familiarize themselves with the related links to get sufficient background information so they can guide students. If using printed information, copies will need to be made according to class size.

Lesson Time: The lesson will take approximately one traditional class period or one half of a block scheduled class.

Lesson Warm Up:

- Ask students if they have ever been in a cave. Allow students to share general experiences.
- Ask students about any cave life that they may have observed in a cave or what they know about cave life.
- Have students describe the conditions that organisms would have to adapt to.
- Review how caves form from the "Karst in the Ozarks" video. Emphasize how karst topography connects the surface to the subsurface by infiltration of ground water.
- Review the endangered and threatened cave organisms that were in the video (see vocabulary list). See what organisms the students can name or describe. Ask the students if they remember why they were threatened. Be aware that some of the organisms are on state or federal Endangered Species or Threatened Species lists, and some are not, but cave biologists still consider all five species to be vulnerable to decline due to habitat loss.
- Discuss with students what "endangered" and "threatened" species need to be protected (see web links above).

- Explain to the students that they are going to use the Internet or provided information to find out about one of the cave organisms named in the video.
- Next tell them that you are going to share nine nature concepts that can be applied to all forms of life everywhere on Earth. Provide students with a copy of the *Nature's Concepts* handout. Go over each concept and discuss examples of them.
- Tell students that they are going to try to match up one or more of these concepts with information about their critter that they are going to be researching and writing a poem about.

The following principles are from the book: *Innovation inspired by Nature: Biomimicry* by Janine M. Benyus

The examples are provided by this lesson's author. Encourage students to think of their own examples as you discuss these. If desired, use an overhead copy of the nature concepts.

Nature runs on sunlight. [Example: *Photosynthesis*]

Nature uses only the energy it needs. [Example: *food webs, chains and tropic levels*]

Nature fits form to function. [Examples: *bird beaks, plant parts, reptile scales, claws, feathers, fur*]

Nature recycles everything. [Examples: *decomposition, fungi, bacteria*]

Nature rewards cooperation. [Examples: *ants, bees, herd animals*]

Nature banks on diversity. [Native ecosystems are stable systems]

Nature demands local expertise. [Examples: *spiders and webs, bird nests*]

Nature curbs excess from within. [Example: *disease, decomposition, carrying capacity*]

Nature taps the power of limits. [Example: *life at the bottom of the ocean or top of a mountain*]

Karst Critter Connection Activity:

- Provide each student with background information about one of the critters. The fact sheets on the Tumbling Creek cave snail and Ozark cave fish are the easiest to read of all the provided resources designated above. Have students read the information and write down key information about the organism (such as physical description, habitat, diet, threats).
- Have students read over the nature concepts again. Have students try to match one or more of the nature concepts to information they have read and recorded about their karst critter. Have students discuss the concepts that they matched with their critter and explain their reasoning. Use the *Karst Critter and Nature Concepts Connections Chart* if desired.
- Have students write a name poem or a biopoem about their critter using information that they recorded.
- See the web link provided for a biopoem outline. Explain to students that a biopoem is designed to be written about people, but they are writing one for their critter instead.
- For a name poem have students write the name of the critter going down a page. In order to write the poem they create sentences, starting each sentence with each letter, and telling information about the critter.

Lesson Wrap Up:

- *Have students share their name poem or biopoem. Students could also make a Venn diagram and compare and contrast two different critters.*

Modifications:

The lesson difficulty could be decreased by making the following adaptations:

- Read over the information provided to students about the critters and have students highlight relevant information that can be used in the chart.

The lesson difficulty could be increased by making the following additions:

- Have students create a PowerPoint about one or all of the Karst Critters.

Assessments:

To assess the students learning have them complete one or more of the following tasks.

- Have the students write a letter from their critter to the inhabitants in the watershed above them. Have the critter explain their perils and ask for specific help to protect them.
- Provide the students with a list of the vulnerable cave organisms. Have the students construct a table that lists the critters, gives a general description of the critter's physical characteristics and potential threats.
- Create a "Wanted Poster" for one of the karst critters. Explain why the critter is "wanted to be protected."
- Write a poem from the critter to people. Below is a deer "advice poem" that can be used as an example.

Deer Advice:

By Shawn Smart

Eat veggies.

Watch both ways before crossing the road.

Stay alert.

Don't let your hide get wasted.

Stay away from spotlights.

The bigger the rack the better the doe.

Chew slowly.